Content Objective: I will be able to apply properties of trapezoids to determine the measures of sides, diagonals, and/or angles.

| TERM | DEFINITION | EXAMPLE |
| :---: | :---: | :---: |
|  | A quadrilateral with exactly one pair of $\qquad$ sides. |  |
|  | The ___ sides of a trapezoid. | $\overline{\mathrm{BC}}$ and $\overline{\mathrm{AD}}$ |
|  | The ___ sides of a trapezoid. | $\overline{A B}$ and $\overline{C D}$ |
|  | The angles ___ to the bases. | $\angle \mathrm{B}$ and $\angle \mathrm{C} ; \angle \mathrm{A}$ and $\angle \mathrm{D}$ |
|  | Each lower base angle is $\qquad$ to the upper base angle on the same side. | $\begin{aligned} & \angle \mathbf{A}+\angle \mathbf{B}= \\ & \angle \mathbf{C}+\angle \mathbf{D}= \end{aligned}$ |

EXAMPLE 1: Find the length of the angle indicated in the trapezoid.

$X=$ $\qquad$

QUICK CHECK: Find the length of the angle indicated in the trapezoid.
$X=$ $\qquad$


| TERM | DEFINITION | EXAMPLE |
| :---: | :--- | :---: |
| MEDIAN | A segment that joins the <br> the legs of a trapezoid. It is <br> to the bases. | of |

The median is equal to half the sum of the length of the bases:
$M N=$

EXAMPLE 2: In trapezoid $\mathbf{A B C D}, \overline{E F}$ is a median. Find each of the following.
$A B=25, D C=13$
$E F=\quad$ units


EXAMPLE 3: In trapezoid $\mathbf{A B C D}, \overline{E F}$ is a median. Find each of the following.
$A E=11, F B=8$
$A D=$ $\qquad$ units,
$B C=$ $\qquad$
$\mathrm{m} \angle \mathrm{EAB}=63^{\circ} ; \mathrm{m} \angle \mathrm{DEF}=$ $\qquad$ -


EXAMPLE 4: In trapezoid $\mathbf{A B C D}, \overline{\mathrm{EF}}$ is a median. Find each of the following.
$A B=29, E F=24$
$D C=$ $\qquad$


EXAMPLE 5: In trapezoid $\mathbf{A B C D}, \overline{\mathbf{E F}}$ is a median. Find each of the following.
$A B=7 y+6, E F=5 y-3, D C=y-2$

$E F=$ $\qquad$

QUICK CHECK: In trapezoid $\mathbf{A B C D}, \overline{\mathrm{EF}}$ is a median. Find each of the following.

$$
A B=6 x-6, E F=7 x-4, D C=38
$$


$A B=$ $\qquad$

| TERM | DEFINITION | EXAMPLE |
| :---: | :---: | :---: |
| ISOSCELES <br> TRAPEZOID | A trapezoid with___ legs. |  |

Label the figure to represent each of the properties listed below:

## PROPERTIES OF ISOSCELES TRAPEZOID

1. It has exactly one pair $\qquad$ sides.
2. The median is equal to $\qquad$
3. The legs are $\qquad$ .
4. The diagonals are $\qquad$ .
5. The base angles are $\qquad$ .


EXAMPLE 6: ABCD is an isosceles trapezoid. Find the missing measurements.
a. $\mathrm{m} \angle \mathrm{ADC}=54^{\circ} ; \mathrm{m} \angle \mathrm{BCD}=$ $\qquad$ -
b. $m \angle B A D=112^{\circ} ; m \angle B C D=$ $\qquad$ -
c. $\mathrm{m} \angle \mathrm{ABC}=95^{\circ} ; \mathrm{m} \angle \mathrm{ADC}=$ $\qquad$ ${ }^{\circ}$


For Examples \#7-8, set up and solve equations to determine the value of $x$.
EXAMPLE 7: DONE is an isosceles trapezoid. $m \angle E D O=110^{\circ}$ and $m \angle D E N=(15 x-5)^{\circ}$. Find the value of $x$.
$\mathrm{X}=$ $\qquad$


## QUICK CHECK:

$A B C D$ is an isosceles trapezoid. $m \angle A B C=12 x-28^{\circ}$ and $m \angle A D C=(5 x+38)^{\circ}$. Find the value of $x$.
$\mathrm{x}=$ $\qquad$


EXAMPLE 8: TRAP is an isosceles trapezoid. $\mathrm{PR}=3 x-7$ and $\mathrm{TA}=20$. Find the value of $x$.

$\mathrm{X}=$ $\qquad$

